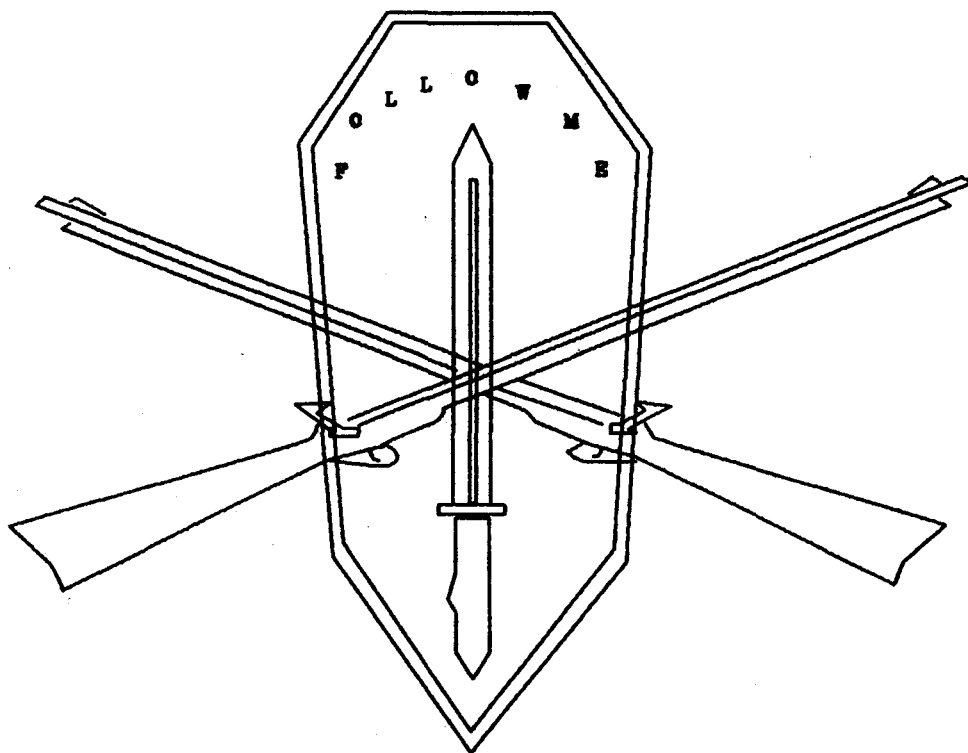


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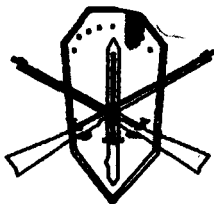


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PREFACE

THIS CORRESPONDENCE IS INTENDED FOR INFANTRY LEADERS AND CONSISTS OF TWO SECTIONS WHICH PROVIDE TOPICS LISTED BY BATTLEFIELD OPERATING SYSTEM (BOS). THE MAJORITY OF SECTION ONE IS A SYNTHESIS OF TOPICS FOUND IN NUMEROUS CENTER FOR ARMY LESSONS LEARNED PUBLICATIONS WHICH SHOULD BE OF PARTICULAR INTEREST FOR INFANTRY LEADERS WHO MAY HAVE TO SURVIVE, TRAIN, AND FIGHT IN A DESERT ENVIRONMENT. EACH TOPIC IN SECTION ONE PROVIDES AN OBSERVATION MADE BY A SUBJECT MATTER EXPERT AND IS FOLLOWED BY ONE OR MORE LESSONS LEARNED. SECTION TWO IS A COLLECTION OF TOPICS WHICH ARE PURE OBSERVATIONS BY SUBJECT MATTER EXPERTS WHO HAVE RECENTLY TRAVELED TO SOUTHWEST ASIA IN CONJUNCTION WITH OPERATION DESERT SHIELD. THESE OBSERVATIONS ARE CURRENTLY BEING REVIEWED FOR POSSIBLE LESSONS LEARNED AND SUBMISSION INTO FUTURE CORRESPONDENCE.

THE INFORMATION IN THIS CORRESPONDENCE MAY OR MAY NOT BE FOUND IN DOCTRINAL PUBLICATIONS BUT IS PROVIDED TO INFANTRY LEADERS FOR THEIR IMMEDIATE CONSIDERATION AND USE AS NEEDED. WE WELCOME INPUT FROM THE FIELD AS A MEANS TO UPDATE OUR EFFORTS. COMMENTS AND INPUT SHOULD BE SENT TO: COMMANDANT, U.S. ARMY INFANTRY SCHOOL, ATTN: ATSH-ES, FORT BENNING, GEORGIA 31905-5420, AUTOVON 835-1140/1589, OR THE INFANTRY SCHOOL HOTLINE AUTOVON 835-7693, COMMERCIAL (404) 545-7693.

THE INFANTRY SCHOOL COMMAND AND STAFF EXPRESS THEIR APPRECIATION TO ALL THOSE WHO CONTRIBUTED INFORMATION FOR DISTRIBUTION TO THE FIELD.

FOLLOW ME

PART I: LESSONS LEARNED

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INTELLIGENCE

TOPIC: The primary intelligence concern for tactical commanders is early warning of hostile intent toward U.S. or allied forces.

OBSERVATION: To provide this warning, intelligence agencies must focus on the threat to deployed forces. To help focus intelligence collection, S2s and G2s should analyze the actions that a hostile force would have to take to conduct an attack on friendly forces. They should create a list of actions that the hostile force would take. This list should be used as an indicator list of hostile intent and as a basis for establishing intelligence collection. For example, one of the primary threats toward friendly forces is a possible terrorist attack. If such an attack were to take place, terrorists would have to take several steps in planning and conducting the attack. These actions might include the following:

- Movement of known terrorist from base locations to areas near friendly forces.
- Increased surveillance of friendly bases or assembly areas.
- Report of strangers in the area.
- Reports of increased attempts to obtain information about friendly forces either from local nationals or U.S. military personnel.
- Reports of movements of explosives into the area.
- Warning to local nationals to stay away from friendly forces.
- Theft of vehicles which might be used in terrorist attacks.
- Communications which may be linked to possible terrorist organizations.
- Any other indicators.

These indicators could be used as a basis for tasking collection assets. As information is obtained that one or more of the indicators have occurred, then the alert status forces would be increased as appropriate. A system of graduated increases in alert status could be tied into the number of indicators satisfied.

LESSON LEARNED: That commanders set up indication and warning centers within their G2/S2 sections at battalion and higher headquarters for different threat scenarios ranging from all-out ground attack, to chemical attack, to air raids.

INTELLIGENCE

TOPIC: Operational security assessments in the desert are different from the temperate zone.

OBSERVATION: Because the threat is considerably different from that which most units have trained against in the past, commanders should consider a top-to-bottom review of security procedures. For example, in most conventional settings, the primary target for enemy rear area operations may be headquarters or Petroleum/Oils/Lubricants (POL) storage areas. The most critical target for the desert environment might well be the water supply. Therefore, a commander might want to put more effort in securing water points than POL points.

LESSON LEARNED: That commanders review their current Operational Security (OPSEC) procedures in light of the current threat and, if at all possible, assign a soldier to each company/battery and scout platoon who speaks the language of the local populace. The soldier may question local inhabitants and/or direct prisoners of war. Additionally, issue to each soldier or squad English-Arabic dictionaries and phrase books and foreign area handbooks covering the history, customs, and psychological makeup of the local populace.

VIEWER NOTES:

MANEUVER

TOPIC: Deception/Defense/Retrograde/Relief.

OBSERVATION: The movement of personnel and equipment and the placement of logistic support installations are normally indicators of a force's intent. The movement of empty boxes/pallets of ammunition and the establishment of fuel storage areas with real or dummy assets can deceive the enemy as to planned offensive actions. Use minimal actual transportation assets making numerous, visible trips to simulate a large effort. There are many examples of successful deception efforts by U.S. forces from World War II. In September 1944, the 43d Cavalry Reconnaissance Squadron (Reinforced) occupied a 23-mile front on the left flank of XX (U.S.) Corps on the Metz Front. This squadron portrayed an armored division for several weeks and was so successful that the German Order Battle Maps showed the 14th (U.S.) Armored Division (AD) to be in the area. The 14th AD was not even in Europe at the time. Expertise in deception operations is critical to success.

LESSON LEARNED: Small convoys can be used to make dust clouds as deception. Tray ration boxes can be filled with sand and stacked at landfills. Trucks can move into and out of the area giving it the appearance of being storage facility or logistic base.

VIEWER NOTES:

TOPIC: Deception.

OBSERVATION: In every modern desert war, deception has played a major role. The lack of concealment leads commanders to believe that with a reasonable reconnaissance effort they can gain an accurate picture of the enemy's dispositions. Reconnaissance by all sides, German, British, Israeli, Egyptian, Syrian, has been sufficient to detect the presence of combat forces in the desert. Deception has been successfully used in each of the modern desert conflicts to mislead enemy commanders.

LESSON LEARNED: Since you can't hide it, make it look like something else: trucks and plywood made to look like tanks, tanks made a look like trucks. Use packing material to establish phoney Ammunition Supply Points (ASPs). Inflatable tanks were used to great success by the British as early as 1940.

VIEWER NOTES:

MANEUVER

TOPIC: When the armor and infantry move, the field artillery must move with them.

OBSERVATION: The most useful technique is for the artillery to move in a formation with a pilot vehicle so that, immediately upon stopping, the artillery is in a position/formation to deliver fire in any direction and simultaneously defend the position from attacks from any direction. The Allies in North Africa in 1942 and units at NTC found that the armor and infantry would outdistance the artillery, unless the artillery moved with them. The artillery moved within 2 to 3 kms of the leading troops to provide responsive support. The armor and infantry provided some protection for the artillery. The whole group moved in what approximated a large box with the artillery in the center of the box and the armor and infantry as the sides. A battalion would move in a triangular formation with two batteries leading and one trailing, each battery 1 to 4 kms from the others.

LESSON LEARNED: Units must practice combined arms exercises on a brigade or larger scale with the artillery moving with the maneuver unit and providing massed fires as needed. Artillery units normally move effectively in a much more open formation. The open formation reduces air attack vulnerability, but increases command and control problems.

VIEWER NOTES:

TOPIC: Tactical Deception, Surprise, and the Movement of Forces.

OBSERVATION: Analysis of desert operations from World War II to the present day indicates that tactical deception and surprise are clearly linked to the ability to move and mass forces during periods of limited visibility.

LESSON LEARNED: Operational planning should emphasize night movement of units. To minimize the problems of dust and enhance deception, movement should be accomplished utilizing multiple routes. Priority should be placed on training to support this requirement. Associated with night movement is the requirement for night passage through lanes in minefields and forward passage through friendly forces.

VIEWER NOTES:

MANEUVER

TOPIC: Routes of March.

OBSERVATION: There are few hard surface roads within the interior of Saudi Arabia, and many of them are not well maintained. Secondary gravel roads and trails crisscross the landscape, but they too are not maintained and quite frequently are like driving on a "washboard." Except for the main arteries, there are few road signs or trail markers except those contracted by the Bedouins.

LESSON LEARNED: Routes of march will quite often be cross-country over rugged and changing terrain with only partially adequate maps and a compass.

VIEWER NOTES:

FIRE SUPPORT

TOPIC: Dust and sand attenuate laser range finders and designators.

OBSERVATION: An analysis after the Israeli wars showed that lasers lost much of their designed effectiveness in certain dust/sand conditions.

LESSON LEARNED: Train units not to rely totally on the capabilities of the equipment, but to think rationally and use the equipment to the best of its capability. Use the lasers' capabilities when possible and common sense when necessary.

VIEWER NOTES:

TOPIC: Preparation for Artillery Direct Fire in Defense of Positions.

OBSERVATION: The Allies in North Africa in 1942 experienced heavy casualties from Axis units overrunning the artillery positions after penetrating the armor and infantry positions. Often, the Axis units would attack from the east at one time, from the west later, and from several directions simultaneously. At first, the Allies simply emphasized direct fire. Later, the Allies attached antitank gun units to the artillery battalions to increase the artillery's antitank ability. Our doctrine of the nonlinear battlefield is similar to the situation the Allies faced in North Africa.

LESSON LEARNED: Artillery battalions should be equipped with LAW/MAW systems. Artillery units should practice direct fire. Since we do not have an antiarmor round for our howitzers, we need all the first-round accuracy we can acquire to make the best use of the capability we have.

VIEWER NOTES:

FIRE SUPPORT

TOPIC: Elaborate survey schemes are not feasible in desert warfare so artillery units must be able to rely on basic and hasty survey procedures.

OBSERVATION: Because of the wide open areas, and the distance involved, the Allies in North Africa found that survey could not keep pace with the artillery-firing batteries and target-acquisition agencies. Firing batteries had to rely on simultaneous observation, celestial observation, and executive officer high-burst registrations to provide accurate data for the firing position. We should have some advantages with our position and direction-determining systems and distance measuring devices, but equipment is lost or fails to function for a variety of reasons in the desert, and the artillery unit must still act.

LESSON LEARNED: Units must become proficient in hasty survey techniques and in basic gunnery procedures such as the executive officer's high-burst registration.

VIEWER NOTES:

TOPIC: If the artillery is not self-propelled, then the artillery needs tracked vehicles to tow the artillery pieces.

OBSERVATION: Because of the relative lack of trafficable country for wheeled artillery, the Allies in North Africa found that only by towing the artillery pieces with tracked vehicles could the artillery move at the same pace as the armor and infantry. Wheeled prime movers bogged down too often to be useful.

LESSON LEARNED: Make arrangements to provide tracked vehicles (M113/M548) to act as prime movers as needed.

VIEWER NOTES:

FIRE SUPPORT

TOPIC: Less Sophisticated Gunnery Methods.

OBSERVATION: The field artillery must be proficient in delivering fires using older, less sophisticated gunnery methods, such as observed firing chart, executive officer's high-burst registration, ranging round, and mark center of sector techniques. Because of the wide open areas with relatively no relief and many times no accurate maps, the Allies in North Africa found that the artillery had to use basic gunnery techniques to provide the necessary support. Our situation should be a little better with modern position determining and survey systems, coupled with automated computational devices, because equipment fails through exposure to heat, dust, sand, and enemy action.

LESSON LEARNED: Units should practice the basic gunnery techniques.

VIEWER NOTES:

TOPIC: Use time and variable time-fuzed munitions to kill and point-detonating fuzed munitions to screen.

OBSERVATION: The Allies in North Africa and the Israelis found that point-detonating fuzed munitions very often buried themselves in the sand prior to bursting, drastically reducing the casualty producing effect, but the bursts raised large clouds of dust/sand which effectively screened units movements. The air bursting munitions were more effective casualty producers.

LESSON LEARNED: Artillery units must prepare to use point-detonating high-explosive ammunition to screen unit movements when smoke/white phosphorus ammunition is depleted.

VIEWER NOTES:

FIRE SUPPORT

TOPIC: Direct Visual Observation.

OBSERVATION: Direct observation will detect and direct counterbattery fire on our artillery faster and in more quantity than any other technique. The Allies in North Africa found that observers could see the flash from artillery pieces at distances of 20 miles and the dust from firing pinpointed the artillery positions. Flash defilade positions and flash reducers were used almost all of the time. The artillery also constructed blast aprons in front of each piece by pouring oil on the ground in front of the gun and laying a steel mesh about 1 inch over the oiled ground. Unless the enemy counterbattery radar capability has increased dramatically, the greatest enemy acquisition threat remains flash/sound ranging and HUMINT/observer acquisition. The North African techniques remain valid.

LESSON LEARNED: Artillery units should receive flash reducers with the basic ammunition load and use them in all missions. The units must practice digging in the howitzers (more bulldozers would help) and building blast aprons.

VIEWER NOTES:

TOPIC: Place more forward observers in infantry and armor units for more effective fire support.

OBSERVATION: Because of the relatively flat terrain and the advantage small increases in altitude give a unit, the Allies in North Africa found that the forward observer with the company commander often could see nothing and could not influence the battle. Their solution was to add another observer to the company. The additional observer was to occupy an observation post to the rear of the company (many times a tower on a tracked vehicle) where he could see the overall battle and have good communications with the artillery unit. This arrangement gave the Allies a good communication link to the artillery and still kept a responsive observer with the company commander; the two teams were in constant communication. Additionally, the general support artillery units received more observer teams which set up in a particular sector to "weight" a given area and to "back up" the direct support observers.

LESSON LEARNED: The COLT parties can act as did the general support observer teams in 1942, but we should add one more observer team and vehicle to each maneuver company and scout platoon.

VIEWER NOTES:

AIR DEFENSE

TOPIC: The desert is an outstanding setting for employing aircraft. Every unit must be extremely proficient at passive and active air defense.

OBSERVATION: The Allies in North Africa and the Israelis in the Middle East found that dispersion limited the effects of air attacks and small arms air defense techniques were effective. Almost every weapon in North Africa had a secondary antiaircraft/antitank mission.

LESSON LEARNED: Emphasize to each unit that, when in position, units must disperse very widely making a less-than-lucrative target. When moving in column and under air attack, units must move at least 40 to 50 meters off the road for the aircraft normally have nose guns trained on the road with wing armament adjusted to fire into the ditches/shoulders on both sides of the road. A vehicle on the road or on the side of the road will die. Additionally, each unit should set up and use a miniature version of the moving target simulator utilizing a screen/sheet, a projector/mirror and the weapon system for training equipped with a flashlight. Aircraft tracking and engagement can then be practiced and evaluated. All soldiers need to be proficient with the weapons in their unit against all types of targets.

VIEWER NOTES:

AIR DEFENSE

TOPIC: Identification, Friend or Foe is difficult, at best.

OBSERVATION: Throughout the entire theater of operations, there are numerous weapon systems that are common to both sides of the conflict (Iraq has Kuwait's equipment and what they have acquired on the open international arms market). The individual soldier is going to be faced with the monumental problem of separating friend from foe by more than just the manufacturer or silhouette of a piece of equipment. This will be true of both air and ground systems. This identification problem will also be compounded by the nonlinear battlefield where focus will not be separated by a line.

LESSON LEARNED: (1) The command and control of the nondedicated air defense assets needs to be the strictest. The nonair defense units should be emphasized to all soldiers. (2) For the dedicated air defense personnel that use visual identification, training on theater directed rules of engagement is a must. Additional measures can be taken by the Theater Command to assist in marking all friendly aircraft for visual identification. (3) Vehicle recognition training and special markings on ground vehicles will enhance the identification process for both ground troops and pilots. (4) Throughout history units have used field expedient methods to identify friendly vehicles. Some of these methods include: chemical lights, tape, flogs, engineer tape in patterns, etc. (5) As did the units in North Africa, set up a "traveling circus" of actual enemy and allied vehicles and equipment to enhance the recognition training.

VIEWER NOTES:

MOBILITY/COUNTERMOBILITY/SURVIVABILITY

TOPIC: Obstacle systems in a desert environment will be difficult to tie in to the terrain.

OBSERVATION: The desert environment is relatively open and does not provide significant terrain features as experienced in Europe or at the NTC. With few significant terrain features, it will be difficult to tie the system in with the ground and prevent the enemy from bypassing the obstacles. It will also require larger obstacle systems, usually minefields, which demand greater logistical support.

LESSONS LEARNED: It will be especially critical that the engineer is working with the maneuver commander to site the obstacles in support of the commander's intent. There will be no luxury to waste effort or material on obstacles which do not support the commander's plan. In addition, current intelligence, coupled with rapid obstacle emplacement (such as FASCAM), can allow obstacles to be emplaced when and where they are needed. Although some systems may not be tied in with the terrain, the bypass provided may bring the enemy into an engagement area, may disrupt his command and control, or may provide flank shots for maneuver weapon systems.

VIEWER NOTES:

TOPIC: Minefields work as well in the desert as in dummy minefields.

OBSERVATION: The Allies in North Africa and the Israelis in the Middle East found that minefields instill a false sense of security in the soldier. Unless the soldiers patrolled the minefields continuously, the enemy lifted the mines and created lanes in the obstacles. Minefields were quick and easy to emplace. Many times dummy minefields, visually identical to actual minefields, served the same purpose as actual minefields by turning the enemy unit. Current conditions are probably little changed with respect to minefields.

LESSON LEARNED: Train every soldier in emplacing and lifting U.S. and enemy mines so that minefields go in quickly and the soldiers are confident in their proficiency. Place a layer of sandbags on the floor of every vehicle to lessen the impact of mine detonations and decrease the number and effectiveness of splinters. Emplaced minefields must be covered by direct fire to avoid rapid breaching.

VIEWER NOTES:

MOBILITY/COUNTERMOBILITY/SURVIVABILITY

TOPIC: Contaminated Casualties.

OBSERVATION: Contamination problems can be greatly reduced if the clothing is immediately removed from all chemical casualties. It is unlikely that chemical casualties will have significant quantities of liquid contaminants on their skin as most will be present on their clothing. This will greatly facilitate moving chemical casualties through medical channels.

LESSON LEARNED: Make it a requirement to immediately remove all clothing from chemical casualties. Cutting it off is recommended.

VIEWER NOTES:

TOPIC: Personal Hygiene.

OBSERVATION: Soldiers tend not to shave every day in a combat situation, especially in a desert environment where water is a precious commodity. But if soldiers do not shave every day, they cannot get a good seal on their protective masks and are likely to become casualties in the event of a chemical attack.

LESSON LEARNED: Make it a command policy that every male soldier shave every day. Use of battery-powered electric razors can reduce water requirements.

VIEWER NOTES:

MOBILITY/COUNTERMOBILITY/SURVIVABILITY

TOPIC: Decontamination.

OBSERVATION: Deliberate decontamination is seldom a good idea in desert operations. The natural weathering due to hot temperatures, wind, and humidity, will normally reduce contamination to acceptable levels before a deliberate decontamination operation could be planned and executed. Also our current decontamination operations require large quantities of water. This in itself will probably preclude conducting deliberate decontamination operations.

LESSON LEARNED: Conduct deliberate decontamination only as an exception to policy when operating in extremely hot temperatures. Ensure that the decision to conduct deliberate decontamination operations makes sense both tactically and technically.

VIEWER NOTES:

TOPIC: Miosis.

OBSERVATION: Threshold concentrations of nerve agent vapors can quickly cause miosis (involuntary constriction of the pupil). This results in loss of visual acuity and depth perception. Effects can last minutes to hours depending on vapor concentration. This will cause serious problems for pilots, riflemen, and anyone else performing duties where visual acuity and depth perception are necessary for mission performance.

LESSON LEARNED: Immediately close mask when a chemical alarm sounds during an attack on your position.

VIEWER NOTES:

MOBILITY/COUNTERMOBILITY/SURVIVABILITY

TOPIC: Wear rubber boots and gloves (MOPP gear) in desert warfare.

OBSERVATION: Wearing rubber gloves and boots in hot weather causes many problems. The hands, which are the least susceptible parts of the body to chemical exposure, quickly become soft making them very susceptible to chemical exposure and mechanical injury. The feet also become soft, but can develop a host of other related problems such as trench foot.

LESSON LEARNED: (1) Do not wear rubber gloves and boots in desert warfare unless direct exposure to liquid mustard agent is imminent. (2) Find clean areas to get relief from wearing rubber gloves and boots before softening of the hands and feet, as well as other associated medical problems, set in.

VIEWER NOTES:

TOPIC: Chemical Alarms.

OBSERVATION: The M-8 chemical alarm detects nerve agents only. The Iraq army has and uses munitions filled with blister agents (i.e., sulfur mustard). They also mix G-agents blister agents and conventional munitions. In this case the alarm would indicate the presence of a nerve agent and miss the presence of the blister agent. A different response is required for nerve agents than for blister agents or a mix of agents.

LESSON LEARNED: (1) Educate all users of the M-8 alarm. (2) Immediately conduct a M-256 ticket test for each M-8 detection. (3) Always expect rear area units, artillery positions, CPs and other fixed or semifixed units to sustain an attack of mixed agents. (4) Use the nose as a very sensitive detector of mustard agents. Have soldiers immediately mask if they smell strange and unexplained odors on the battlefield once chemical attacks, using mustard, have been initiated. (The nose is more sensitive to blister agents than most alarms. The sulfur mustards that the Iraq army uses smell much like garlic or new-mown hay, and the nose can smell this in extremely low doses. But mustard agents quickly deaden the olfactory nerves (sense of smell), and secondly, not everyone will recognize mustard's characteristic odors. Therefore, soldiers should immediately mask when they smell strange odors because if it is mustard, and they don't mask, they will conclude that they really didn't smell anything due to their lost sense of smell. Intelligence and experience factors should mitigate over reaction to false alarm.

VIEWER NOTES:

MOBILITY/COUNTERMOBILITY/SURVIVABILITY

TOPIC Characteristics of Chemical Agents in Desert Climates.

OBSERVATION: Chemical agents dissipate rapidly in hot weather. Hot air convection currents carry agents upward and, therefore, minimize cloud travel and the threat of vapor hazards for ground troops. On the other hand, this creates a greater threat to pilots than they would face under a more moderate climate.

LESSON LEARNED: (1) Think of classic G-nerve agent persistency to be similar to that of water: It has little chemical similarity, but it does evaporate at about the same rate. Almost everyone can relate to how quickly water evaporates in most terrain and under climatic conditions. In very hot weather, like water, classic G-nerve agents last only minutes, but create a significant, short-lived vapor hazard. G-agent effects are immediate. (2) Think of mustard agents as being delayed-acting (effects often coming 6-12 hrs after exposure) persistent chemical agents with the following rules of thumb. In the hot, daytime desert temperatures, mustard persistency will be about 6 hours or less if the mustard agent is exposed to the atmosphere (e.g., not buried). With winds of 4 kmph or greater, the persistency is reduced to around 2 hours. (3) Think of classic V-nerve agent persistency to be similar to that of liquid mercury, i.e., it hardly evaporates at all. It therefore is mainly a touch hazard with long persistency (its persistency is dependent on chemical reactions with the elements, not on evaporation). V agents, like mustard agents, are delayed acting because they must soak through clothing and the skin to be effective. Once in the blood stream, however, they are extremely fast acting and symptoms, to include death, will occur in seconds to minutes. Entry through wounds, cuts, etc., will produce immediate effects. (4) During periods of active chemical warfare, have at least one helicopter pilot masked at all times.

VIEWER NOTES:

COMBAT SERVICE SUPPORT

TOPIC: Driver and Convoy Training in Desert Environment.

OBSERVATION: The intense ambient light of the desert environment, in concert with the relatively open terrain, mandates that convoys be conducted during periods of limited visibility whenever feasible. The ability of a convoy to reach point "B" is often dependent upon the use of a compass and the vehicle's odometer.

LESSON LEARNED: Drivers must be trained in those navigational skills associated with the use of the compass and odometer, as well as with driving in a desert environment, in the intense sunlight, heat, unique terrain, etc. Assistant drivers should be the norm and not the exception.

VIEWER NOTES:

COMBAT SERVICE SUPPORT

TOPIC: Rubber Deterioration.

OBSERVATION: Areas of packed sand and rock and lava beds occur more frequently in Saudi Arabia than in the soft sand desert imagined by many Westerners. This terrain shortens tire life. During each 3 day field training exercise it underwent in 1982, the Saudi Arabian National Guard (SANG) modernized 5th Artillery Battery registered a flat tire rate of 40 percent. The rate is about standard for all units. The majority of flats are attributable to the wear and tear of off-road travel rather than to road heat, high temperature, dryness, potholes, or abuse. Sharp rock itself rarely punctures a tire outright, but over a short period of time, it weakens the tire's structure by constant wear on the tread. It may be difficult to detect tire problems when a vehicle is moving over rough terrain. A simple repairable puncture can result in a ruined tire and a bent rim. It is common to see large chunks of tread ripped away after travel over lava rock.

LESSONS LEARNED: Exercise extra care in driving over lava patches and rough ground. Check tires frequently for signs of wear and cuts. This will necessitate slower movement and tighter control over column spacing to prevent bunching at obstacles.

VIEWER NOTES:

TOPIC: High Failure Repair Parts.

OBSERVATION: Dust, sand, rough terrain and temperature extremes cause an estimated 50-percent increase in repair parts required to support a combat unit. In general, parts subject to friction fail with greater frequency in the desert than under U.S. or European conditions. In this category are practically all engine parts, brake shoes, upper and lower control bushings, wheel bearings, and carburetors. Carburetor failure can be forestalled by preventive maintenance. Vehicles parked for long periods in the sun tend to sustain damage to exposed plastic and rubberlike dashboard tops, wipers, and trim. Rubber seals are prone to dry rot. A combination of heat and dryness makes plastic parts in the engine compartment particularly susceptible to breakage.

LESSON LEARNED: Mechanics will need additional stocks of friction bearing parts, plastic and rubber parts, and rubber seals. Also, cracking and breaking of cast metal parts is common due to constant excessive vibration during operations.

VIEWER NOTES:

COMBAT SERVICE SUPPORT

TOPIC: Batteries.

OBSERVATION: Portable training devices and life support equipment that rely on batteries, malfunction frequently unless the batteries are kept out of direct sunlight. Heat quickly discharges the stored energy in batteries. Although power generators are an alternative, they can also cause problems. When exposed to extreme heat, wind, and windblown sand, they become a maintenance nightmare. Specific devices immobilized by electrical problems for the above reasons include target mechanisms, radios, and remote control units. Vehicle batteries have been found to go dead after relatively short periods of vehicle inactivity (5 to 10 days).

LESSON LEARNED: Whenever possible, hard-wire stationary electrical devices to commercial power sources. Exercise vehicles regularly.

VIEWER NOTES:

TOPIC: Vehicles Cooling Systems.

OBSERVATIONS: Operations in hot weather or on rough terrain increase the chances an engine will overheat. Lengthy high-speed operation, hardpulling operations, and low-gear negotiation of steep grades or soft sand have caused overheating. Cooling systems efficiency drops with the calcification of water channels caused by use of water with high mineral content. Poor cooling will also result from dirt between radiator cooling fans.

LESSON LEARNED: Avoid continuous use of vehicles in low gear range. Replenish radiators with potable water except in emergencies. Blow dirt out of radiators with compressed air or a jet of water.

VIEWER NOTES:

COMBAT SERVICE SUPPORT

TOPIC: Vehicle Filtering Systems.

OBSERVATION: Air, fuel, and oil filters require daily servicing in the desert. Ambient air that appears clean is actually laden with fine dust, even on a clear day. Replacement of all filters must be on a more frequent basis than recommended. Close attention to filters pays in fewer maintenance problems. It is not uncommon for an air filter to become completely useless in three days even when cleaned daily or more often.

LESSON LEARNED: Greater numbers of filters of all types should be stocked for use in desert operations.

VIEWER NOTES:

TOPIC: Lubrication of Weapons.

OBSERVATION: Some field-experienced personnel strongly believe that soldiers operating in the desert should not lubricate any weapon unless it is being taken into combat immediately. Conventional lubricants attract more dust and dirt than would accumulate if the weapon were left dry. There is no danger of rust most times of the year. Especially conscientious soldiers stuff oily rags down barrels or wrap the rags around jam-prone mechanisms. Weapons system manufacturers continue to recommend generous lubrication in their consulting visits to Saudi Arabian National Guard (SANG), emphasizing that lack of lubricant affects the weapon both in storage and in operation.

LESSON LEARNED: Weapons should be lubricated in accordance with U.S. standards while in storage; however, when weapons are in use, they should not be heavily lubricated.

VIEWER NOTES:

COMBAT SERVICE SUPPORT

TOPIC: Vehicle Lubrication.

OBSERVATION: Oil should be changed about twice as often as recommended, not only because grit accumulates in the oil pan but also because uncombustible low-octane fuel seeps down the cylinder walls and dilutes the reservoir. Diluted oil lubricates and cools less effectively, and evaporates at high temperatures generated during engine operation, necessitating more frequent topping off. High-grade 20W-50 oil has served well in desert conditions.

LESSON LEARNED: Oil changes and lubrication of under-carriage points at more frequent intervals will prolong engine and vehicle life under desert conditions.

VIEWER NOTES:

TOPIC: Effects on Optics.

OBSERVATION: Optics in central Saudi Arabia are completely free of moisture-related problems. However, in areas adjacent to the Arabian Gulf and the Red Sea, problems with condensation and moisture occur more often than usual. The major threat to optics is wind blown sand, which gradually degrades its performance by; pitting and scratching the lenses.

LESSON LEARNED: Regular maintenance and inspection of optics will help eliminate or control moisture-related problems. Lens covers should be used to prevent damage from dust and blowing sand. If possible, keep the system completely covered until ready for use.

VIEWER NOTES:

COMBAT SERVICE SUPPORT

TOPIC: Wire Deterioration and Usage.

OBSERVATION: Field wire (WD-1) is used to supplement 32-pair wire in the Saudi Arabian National Guard (SANG) field telephone system. Problems arise in attempting to maintain a continuous circuit and a reliable land-line communications system. Heavy vehicles driving over buried wire cause breaks and cuts. Dry rot on insulation exposes wire. It then will not conduct, or, at best, conducts poorly, resulting in dead or intermittently operational lines. Also, irregular tension on lines causes connections to pull away, breaking the communications link.

LESSON LEARNED: Shielded cable is more sturdy and reliable than wire presently used by the SANG. Shielded cable is less prone to the problems listed above, and would more effectively maintain telephone communications under desert conditions.

VIEWER NOTES:

TOPIC: Consumption of Liquids.

OBSERVATION: Unacclimated Westerners dehydrate extremely rapidly in the desert. The only sure solution is forcing fluids-drinking even when not apparently thirsty-on some sort of schedule, if possible. Experience indicated that if a man feels thirsty in the desert, he is already on the borderline of trouble. The Arabs drink a very sweet, hot tea. It is possible there is good reason to imitate them.

LESSON LEARNED: Force liquids. Drink water even in the absence of thirst.

VIEWER NOTES:

COMBAT SERVICE SUPPORT

TOPIC: Eye Protection.

OBSERVATION: The importance of wearing eye protection in the desert cannot be overstressed. Some people prefer sunglasses, others like goggles. Both have advantages and disadvantages, but both accomplish the goal of keeping out direct and reflected sunlight and reducing the numbing effect of cold winter winds.

LESSON LEARNED: Wear sun glasses or goggles in the desert.

VIEWER NOTES:

TOPIC: Fuel Contamination.

OBSERVATION: One source of fuel contamination is the re-use by the Saudi Arabian National Guard (SANG) of gasoline tankers to transport or store diesel fuel, and vice versa, without first flushing. The Saudi government-owner fuel company, Petromin, controls the only facility in the country for flushing out tankers. Because there is no other place performing this service, the pressure of operational necessity often forces the driver to skip this important procedure.

LESSON LEARNED: If a unit is required to flush a tanker to transport a different product, the availability of local facilities should not be included in the planning.

VIEWER NOTES:

COMBAT SERVICE SUPPORT

TOPIC: Nonpotable Water.

OBSERVATION: Because local water in central Saudi Arabia is highly saline, supply units are often called upon to provide "sweet" water (that is, drinking water) for cleaning and maintenance. Saline water calcifies in automobile cooling systems, reducing cooling capacity. It corrodes metals when used for washing. There are isolated open wells in some of the wadis. Abundant water is only available from wells which are drilled to tap under-ground rivers and lakes at depths of 3,000 to 8,000 feet. The water from this source has an extremely high mineral content which makes it unsafe to drink.

LESSON LEARNED: Plan on supplying unusually large quantities of drinking water because of the unsuitability of local water for drinking, cooking, cleaning and maintenance. Experience in the Saudi Arabian National Guard (SANG) battalions indicates that a unit will require at least 7 gallons of water per man per 24-hour period.

VIEWER NOTES:

TOPIC: Ammunition.

OBSERVATION: Experience indicates that artillery ammunition is consumed in greater quantities than would normally be expected in a different environment. This is due to the expansive open terrain upon which an engagement would probably occur. Erratic ballistic behavior has been observed on artillery and tank rounds due to excessive heat.

LESSON LEARNED: Increase consumption planning for artillery and anti-tank ammunition. Ammunition should be stored in areas with a double sun shade. Wherever possible, in addition to the double sun shade, the ammunition should be stored approximately 1 m below the desert floor. This method reduces ambient temperature in the storage site below 100 degrees F.

VIEWER NOTES:

COMBAT SERVICE SUPPORT

TOPIC: Storage.

OBSERVATION: Operation of mechanized forces in the desert will require a considerable number of POL storage sites. In most desert areas in Saudi Arabia, storage systems are antiquated. Devices for determining the state of POL contamination may be lacking. As an example, local systems are not equipped with sampling and gauging hatches. Standard U.S. sample breakers will not fit down refill hatches. The local storage tanks also have no strapping charts for determining the precise volume from tank fluid levels. Bottom samples cannot be drawn up to test for contamination.

LESSON LEARNED: It is not possible to determine the precise volume of fuel in local storage tanks or to determine the degree of contamination without special equipment.

VIEWER NOTES:

COMMAND AND CONTROL

TOPIC: Observation at Great Distances.

OBSERVATION: A person standing on a hill 300 m high can see, depending on the landscape, for 20 or 30 km on a clear day. But land that looks flat from the hill actually has two ridgelines in that distance. The uniform color of the land and the even lighting at midday make it difficult to distinguish changes in elevation at great distances. The effect is similar at near range. Soldiers frequently aim at an enemy vehicle with a recoilless rifle without noticing the stretch of low ground in between. The round falls short. It is not a question of carelessness, but of optical illusion. This has an effect on range estimation and targeting.

LESSON LEARNED: The casual observer will frequently miss intermediate features in the landscape. An observer must think about what he sees, and look for the unexpected.

VIEWER NOTES:

TOPIC: TOW.

OBSERVATION: Some observers have complained that the TOW antitank weapon kicks up an excessive dust signature with its backblast. The complaint does not deserve a great deal of attention, since the TOW is such an effective weapon overall. If it is placed intelligently (that is, away from soft sand), its visibility to an enemy would be minimal. Furthermore, in the heat of battle, dust would be generated by anything moving. This would camouflage the signature made by TOW.

LESSON LEARNED: TOW is a highly effective antitank weapon in the desert. Its dust signature, albeit a consideration, is not a serious drawback.

VIEWER NOTES:

COMMAND AND CONTROL

TOPIC: Desert Fog.

OBSERVATION: In the desert, temperature fluctuation and moisture in the air may produce fog that forms a belt that may move rapidly through an area of operation or hang suspended for extended periods. In numerous instances, operations involving the SANG have been disrupted by this desert fog.

LESSON LEARNED: Because visibility is cut to almost zero during desert fog, vehicle operations, land navigation, target acquisition, enemy observation, and direct fire are seriously affected. However, units with thorough knowledge of the terrain in their areas of operation can effectively use this fog to disengage from the enemy, or conduct raids or ambushes.

VIEWER NOTES:

TOPIC: Dispersion.

OBSERVATION: Any bunching of vehicles in open areas is easily detected at ranges up to 10 km from the air or high vantage points.

LESSON LEARNED: Unit elements should be dispersed to the greatest degree possible using all available natural cover and concealment.

VIEWER NOTES:

COMMAND AND CONTROL

TOPIC: Time Management.

OBSERVATION: Time is always lacking, especially in desert operations. The travel time associated with the open expanses of the desert has generated some practical procedures adopted by successful commanders.

LESSON LEARNED: The following procedures warrant special consideration. Warning orders enjoy greater emphasis. Units must routinely move without the presence of commanders. They must train to this requirement. To the maximum degree possible, commanders and staffs should go forward to issue orders. This buys critical time for subordinate commanders. Don't drive when you can fly. Maximum use should be made of aviation assets to buy commanders time. This is true at all levels of command.

VIEWERS NOTES:

TOPIC: Physical Conditioning, Area Orientation, and Acclimatization.

OBSERVATION: German operations during World War II in North Africa indicate that U.S. forces should require only a brief acclimatization period of 5 to 8 days. German experience in World War II indicates that this period is not absolutely essential since troops deployed without a period of acclimatization proved no less efficient in combat than those who lived for a time in a warm/temperate climate. German historical records indicate transition periods should be kept brief as longer transitions only contribute to a loss of efficiency in the force.

LESSON LEARNED: During the transitional period, soldiers should receive training for desert operations. Historical evidence shows that peak efficiency can be maintained for a period of 1 year. After 1 year, unit and individual performance is reduced per year of exposure. Make sure that each soldier has goggles and eyewash to prevent conjunctivitis. Additionally, contact lenses should not be worn.

VIEWER NOTES:

COMMAND AND CONTROL

TOPIC: Delegation of Authority in a Chemical Environment.

OBSERVATION: Leaders have a tendency to not delegate authority while in MOPP gear and try to do too much themselves. Consequently, they become the first to fall out due to sheer exhaustion.

LESSON LEARNED: Error on the side of overdelegation during periods where MOPP gear is worn. Let the number two man handle the action, as our doctrine requires, so the number one soldier can get uninterrupted rest.

VIEWER NOTES:

TOPIC: In most cases, overreaction to the chemical threat is worse than underreaction.

OBSERVATION: Wearing the MOPP suit in hot desert temperatures as a precautionary measure to impending chemical attacks can result in more casualties, including death, than a chemical attack would produce. Wearing MOPP gear and doing hard work, such as humping ammunition, digging in, or attacking, can quickly put soldiers at risk. The internal body temperature is quickly elevated (upwards of 105 degrees F) and the heat-regulating mechanisms of the body are destroyed. Death results. Unless the chemical attack is a direct hit on one's location (most won't be), there is adequate reaction time to assume a MOPP posture if MOPP gear is readily available. At least, the risk is less in hot temperatures than by keeping soldiers in MOPP gear as a precautionary measure. If the attack is off target, it will only arrive at the speed of the wind. Closing your eyes and holding your breath will buy valuable time to get a protective mask on. The MOPP suit can then be quickly donned, if necessary, for a mustard vapor or liquid hazard.

LESSON LEARNED: (1) Always operate at minimum MOPP levels. Accept risk in the chemical defense business just as with any other aspect of warfare. Expect a fair share of chemical casualties along with other conventional casualties. (2) Remember, mission accomplishment is paramount, and risks must be taken if MOPP posture will prevent mission accomplishment. (3) Don't win the chemical survival battle and lose the tactical battle. (4) Don't become consumed with chemical survival and ignore other important tasks, missions, etc.

VIEWER NOTES:

COMMAND AND CONTROL

TOPIC: The soldier usually does not get the whole story.

OBSERVATION: History has shown that sometimes the troops are misinformed on the capabilities of a piece of equipment or a unit's capability to execute a mission in a specified time. This misconception is enhanced by limits to training and shortcuts in training to meet mission goals. As an example, Task Force Smith, which as a well-trained unit, was not told of the inability of the 90mm rocket to penetrate the frontal armor of North Korean tanks. Panic set in after rounds bounced off the front of the tanks. Another area of misinformation is staff actions. During training exercises, we approve actions like movement requests and air support to enhance training or the play of an exercise. This may lead the subordinate to expect it that fast during an actual conflict or war. This false perception can cause units major problems.

LESSON LEARNED: Command information programs which provide the soldier realistic capabilities, information and solutions are required. TC 90-16 (Armor/AntiArmor Operations on the Integrated Battlefield) is one source which provides capabilities and solutions. Soldiers need to know! Explaining why certain Tactics, Techniques, and Procedures (TTPs) are required during training is another method of providing the soldier with the information. Tying the capability to TTP reinforces the information. An especially effective technique used on North Africa was for all soldiers to fire their weapons at enemy vehicles and equipment on training ranges to gain confidence in the weapons and to see first hand the effects of the weapons on the enemy vehicles and equipment.

VIEWER NOTES:

COMMAND AND CONTROL

TOPIC: Engagement Areas in Open Terrain.

OBSERVATION: CTC experience has identified a current problem in the control of direct fire. This problem is exasperated in open terrain where the reduced presence of identifiable terrain features makes it difficult to construct engagement areas that are well defined.

LESSON LEARNED: Clear identification of engagement areas is necessary to facilitate the massing and distribution of fires. In the absence of identifiable terrain, target reference points (TRPs) can be created with damaged/destroyed vehicles that are moved into required locations at the direction of commanders invested with the responsibility for specific engagement areas. Other types of TRPs could be used. For example, marker panels, visible and infrared chemical lights, flags, and white phosphorous/illumination rounds. The German army made use of smoke rounds to facilitate fire distribution during World War II.

VIEWER NOTES:

TOPIC: Because of the wide open terrain, commanders often fail to appreciate correctly the time distance relationships in planning the battle.

OBSERVATION: The effort to synchronize Battlefield Operating Systems during the planning process can be negated by the failure to continue the synchronization effort during the preparation phase of a mission. This is especially true in the construction of engagement areas for defensive operations. Direct fire, indirect fire, and obstacles are linked, and the adjustment of one requires the adjustment of all. The commander must know and have a good feel for what his unit can do, how long his unit takes to do it, and what he really wants his unit to accomplish.

LESSON LEARNED: Adjustment of the elements of the Battlefield Operating Systems can unravel the focus of a commanders's intent. This is especially true in open terrain. Tactical commanders should personally direct the synchronization of engagement areas. Obstacles should be positioned, indirect fires adjusted, and direct fires rehearsed under the personal supervision of the commander. The commander must take his unit out and actually time them performing certain actions to his standard so they understand his intent and he knows exactly how long they need to reach his goal. The unit must practice moving, digging, and fighting, and the planners must know the planning factors for that specific unit.

VIEWER NOTES:

COMMAND AND CONTROL

TOPIC: Reassembling Scattered Units.

OBSERVATION: Reassembling units which become scattered or separated is always a problem which merits consideration. How commanders gain control of these fragmented units is worthy of serious consideration due to the operational impact and because of the potential security problems associated with conventional recovery techniques.

LESSON LEARNED: The use of pyrotechnics has traditionally proven to be an effective measure to assemble units which have become fragmented due to enemy action or navigational problems. This measure will continue to be effective in the future. Senior commanders should ensure that the signals for assembling units are standardized to avoid confusion on the battlefield. Additionally, senior commanders should carefully consider the possible security compromise if a small unit commander initiates an assembly measure at a time or place which is not appropriate. Restrictions may be appropriately specified in the basic order.

VIEWER NOTES:

TOPIC: Training in Assembly Areas.

OBSERVATION: The German army in North Africa made extensive use of available time for the training of units and soldiers. General Montgomery also stressed training for units of his 8th Army.

LESSON LEARNED: For soldiers and small units, the following areas warrant special consideration: (1) Exercises of all types in marching and maneuvering in open, sandy terrain. (2) Techniques of cover and camouflage in open terrain, recognition and identification of targets in varying light and temperature conditions. (3) Boresighting, zeroing, and firing of all weapons at maximum effective ranges. (4) Night driving in sandy terrain, navigating by compass or stars. (5) Laying and recovering mines, constructing fortifications in sandy terrain.

VIEWER NOTES:

COMMAND AND CONTROL

TOPIC: Navigation in the Desert.

OBSERVATION: Navigation may be the single most important technique for desert warfare. Units have traditionally used a combination of compass, odometer and time to assist in navigation when terrain features were minimal. These methods are effective and should continue to be emphasized in unit training.

LESSON LEARNED: Division-or-corps-level staffs should publish the exact degree reading for sunrise and sunset. It would be helpful and more accurate for soldiers to know the exact bearing to the sun every day. Additionally, a summary sheet on celestial navigation should be published. Since most movement in desert operations is conducted at night, it would be very beneficial to have instruction and navigational aids available to units. Senior commanders should also consider ways to mark critical routes during operations. Training should stress the ability to navigate during periods of reduced visibility in unfamiliar terrain. Techniques, such as resection, the use of marking rounds, and the designation of extra navigation teams within tactical functions, should be employed. Every vehicle should be equipped with a compass.

VIEWER NOTES:

PART II: OBSERVATIONS

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INTELLIGENCE

TOPIC: Intelligence support process is not happening.

OBSERVATION: The unit has no idea of what is going on North of the border - is ARCENT the stopper? We need to know down to the weapon system on location and intention. This is really important at the tactical level - how do we hit a TAI (target area of interest) if we don't know about the enemy - how do we time/phase the battle - is the enemy echeloned or not? Intell must be pushed to the lower levels.

VIEWER NOTES:

TOPIC: Intelligence Preparation of the Battlefield (IPB).

OBSERVATION: Iraqi positions have been noted as having a "screen" erected 60 to 80 feet in front of tank and armored vehicle positions. The screen is 20 feet long and approximately 10 feet high and is thought to have three (3) possible functions: standoff for AT rounds, to portray a false radar image, or to provide a false location for laser designating weapons.

VIEWER NOTES:

INTELLIGENCE

TOPIC: Reconnaissance.

OBSERVATION:

- Any attack or raid must be based on extremely detailed intelligence due to lack of natural control measures.

- Rifle companies must dedicate extremely long time periods for recon. Movement is slow.

- Prior route recon and marking are key to main supply route success.

- Route recons to alternate and supplementary positions are very important because of several small cliffs and sand traps.

- Terrain association is next to impossible because of poor maps and shifting sand.

- Recon every movement, no matter how short.

- Dig in Ground Surveillance Radar (GSR's) so that only the screen is visible.

- GSR's can be used effectively to conduct link-up operations.

VIEWER NOTES:

MANEUVER

TOPIC: Highways are generally marked in the European standard.

OBSERVATION: Major highways are well marked - in both Arabic and English for destination cities. Height and weight restrictions generally are only marked in Arabic. Soldiers should be given a card showing basic Arabic numbers and directions. Street signs and markings in cities and towns are virtually nonexistent. Maps have not proven to be accurate if over five years old due to commercial development.

VIEWER NOTES:

TOPIC: Off road trafficability.

OBSERVATION: Off the road a sabkhat (salt marsh) will not support multiple wheels (convoy) or any heavy transportation or tracks.

VIEWER NOTES:

TOPIC: Oil wells location marking.

OBSERVATION: Oil well locations are sometimes marked by a short pole 10-12 feet high with a 55 gal barrel welded horizontally across the top. Units need to stay at least 500 meters away from these locations if possible because some well heads are pressurized and running over the cap could cause a violent release of either gas or crude oil.

VIEWER NOTES:

MANEUVER

TOPIC: Driver's training classes.

OBSERVATION: Give driver training classes on how to drive in the sand it's not as easy as you think - the sand varies from chalk powder to rock gravel. It is an absolute necessity to deflate tires when driving in loose sand.

VIEWER NOTES:

TOPIC: Maneuvering in the desert.

OBSERVATION:

- Terrain requires wide dispersion. Takes much longer to fire and maneuver on contact.

- Terrain is seldom completely flat. Cover and concealment is available from direct fire.

- Dismounted movement is best concealed during limited visibility. Movement is extraordinarily visible during daylight.

- Difficult to mass supporting fires in excess of 300-400 m in limited visibility.

- Night observation devices very effective on raid maneuvers.

- More 1:50,000 maps are needed. Barely enough to get down to company or battery level.

- TOWs must be massed to make a difference.

- Except for security for raids, Infantry without transportation is of little value.

- Day land navigation in the desert is hard; night land navigation is extremely difficult.

VIEWER NOTES:

MANEUVER

TOPIC: Enhancing mobility in the desert.

OBSERVATION:

- Small Lightweight Global Positioning System Receivers (SLGRS) or other similar navigational aids are needed.
- Longer range weapons like .50 cal or MK19 (40MM) are needed in lieu of 7.62MG. Cargo M998 should have some type of "pole" mount in the bed.
- TOW night sights "may" need purging more often.
- JP8 burns faster than diesel. Adjust planned consumption rate.
- Vehicles need self recovery kits (PSP or wooden lathe "sand ladders.")

VIEWER NOTES:

FIRE SUPPORT

TOPIC: Establish Target Reference Points (TRPs).

OBSERVATION:

- TRPs and ranges difficult to establish without COLT or actual pace count.
- Any dismounted movement must be covered by indirect fire.
- Forward Observers (FO's) must be on high ground to be effective.
- TRPs must be thermal.

VIEWER NOTES:

AIR DEFENSE

TOPIC: The effectiveness of Vulcans in the desert environment.

OBSERVATION:

- Vulcans can improve covering fire for maneuver elements.
- Vulcans can reduce rural Arabic built-up areas as effectively as indirect fire.
- Towed Vulcan systems immobility in deep desert sand negates ability to perform cover/screen missions.

VIEWER NOTES:

MOBILITY/COUNTERMOBILITY/SURVIVABILITY

TOPIC: Pipeline safety/well heads.

OBSERVATION: Pipeline safety/well heads - some are pressurized and carry oil which can produce hydrogen sulfate gas if ruptured. Corps is working with Aramco to locate and identify crossing sites and weight capabilities.

VIEWER NOTES:

TOPIC: Soil conditions in the desert environment affect engineer support.

OBSERVATION:

- Triple number of sandbags needed to strengthen the walls of defensive positions.

- There is very little natural terrain to identify engagement areas. Must use engineer support and terrain to channelize the enemy into engagement areas.

- Units will rely heavily on engineer support to channelize the enemy into engagement areas.

- The terrain for the most part is either very loose sand or solid rock. Survivability positions will require engineer assets in solid rock and some type of fortification in loose sand.

VIEWER NOTES:

MOBILITY/COUNTERMOBILITY/SURVIVABILITY

TOPIC: Mobility/countermobility/survivability.

OBSERVATION:

- Woodland nets provide a little shade, but not much camouflage.

- Camouflage nets are fairly effective against aerial observation; however, they are not as effective for concealment from ground observation.

- A strip of burlap over windshield of wheeled vehicles reduces chances of reflection off of glass surface.

- High temperatures can cause NBC protector masks to deform if improperly stored or used as a seat, pillow, etc.

- M-8 alarm batteries have shorter lives at high temperatures. This can be extended by placing them a few inches off the ground and providing them with shade.

- Nerve agent pills (NAAP) should not be initially stored in the shirt pocket, since the packets get broken open and sweat dissolves the pills. The mask carrier or NBC bag is a better place to store these pills.

VIEWER NOTES:

COMBAT SERVICE SUPPORT

TOPIC: Placement of tents - Tactical Operations Center (TOC) extensions.

OBSERVATION: Consider facing the track vehicles in the TOC location so that they face SW. This presents the tent sides to the rising and setting sun (which rises in the NE and sets in the SW). This also allows the prevailing wind (NE) to enter the open ends of the extensions. In the Shamal (dry, windy) season, consider reversing this orientation to block the sand and wind blowing from the NW. This same principle applies to tents and awnings.

VIEWER NOTES:

TOPIC: Commo link with aviation MEDEVAC.

OBSERVATION: Commo links to aviation MEDEVAC difficult to non-existent. There is a dedicated FM net but as of today there is no agency monitoring it. Class III resupply is becoming more difficult as supplies which units deployed with are used up.

VIEWER NOTES:

TOPIC: Installation of shower unit and latrines.

OBSERVATION: Shower units and latrines need to be anchored down so they don't blow over in the wind and become damaged. If these units are placed on the south side of the perimeter, the tents and other equipment will help form a wind break. In addition, the smell leaves the perimeter rather than drifting through it. They should also be facing East and West so they present a smaller surface area to the wind. Shower and sink units should be placed where drainage goes away from troop living and working areas. This moisture draws bugs and snakes.

VIEWER NOTES:

COMBAT SERVICE SUPPORT

TOPIC: Oil coverage of roads and landing areas.

OBSERVATION: Oil on the ground is OK, but don't use it near water sources and agricultural areas. (Not much of a problem here in the desert - more of a coastal problem.)

VIEWER NOTES:

TOPIC: Assignment of linguist personnel.

OBSERVATION: The linguist situation must be addressed right up front - if possible linguist or other civil affairs guys have got to be assigned down to the squadron/battalion level. You can't hardly move anywhere or do anything without tramping on some civilian (Saudi or Bedouin) with whom you have to coordinate. Due to the large number of civilian contract transportation drivers, you got to have someone around who can tell them where and how you want to off-load material or you'll have an instant goat-rope on your hands.

VIEWER NOTES:

TOPIC: Process of cooling individual water supply.

OBSERVATION: Dump water in canteen carriers or pour water over a sock which has been pulled up over a water bottle to keep the water cool. Water will quickly heat up if this is not done.

VIEWER NOTES:

COMBAT SERVICE SUPPORT

TOPIC: Unserviceable protector masks.

OBSERVATION: Some units has over 100 masks unserviceable as a result of the soldiers sitting on their masks or using them for cushions since there is a lack of other places to sit in the area. The chemical officer has managed to trade some MK1 injector kits for additional masks from the Marines.

VIEWER NOTES:

TOPIC: Desert Shield accidents.

OBSERVATION: Some weapon wounds are the result of soldiers playing with knives (on a side note, the "on-the-spot" safety award for commanders is a knife). Some fire injuries are the result of aerosol cans being burnt in trash and exploding. All four (4) Class A aircraft accidents were sand dune strikes at night (goggles problem).

VIEWER NOTES:

TOPIC: Mosquito netting.

OBSERVATION: Mosquito netting needs to be tucked under the sleeping bag and not allowed to lay on the ground. Scorpions have crawled up on the netting inside the net and dropped onto personnel in the sleeping bag. Netting isn't essential at this time, but may be needed later in the year as the rainy season approaches. Currently (10 Oct 90) there isn't a problem with mosquitoes and most soldiers only use them if attempting to sleep during the day. Flies are extremely bothersome during the day but are not a problem at night.

VIEWER NOTES:

COMBAT SERVICE SUPPORT

TOPIC: Track vehicle operations.

OBSERVATION: Don't operate tracks between 1000 and 1600 hours as the excessive heat has been melting the glue on the road wheels allowing the rubber to separate from the hubs.

VIEWER NOTES:

TOPIC: Fresh vegetables and fruits are a problem.

OBSERVATION: Fresh vegetables and fruits are a problem. If it can't be adequately washed or peeled the units have not been using it. (Examples are broccoli and cauliflower, cabbage and head lettuce.) Items like fruits, tomatoes etc. which can be scrubbed are generally OK after washing. Marines have had problems with salads from the start.

VIEWER NOTES:

TOPIC: Water supply.

OBSERVATION: If bottled water is left sitting around (especially with the lid open) it will become contaminated quickly. Don't allow soldiers to open more than one bottle of water at a time - they will tend to get a new bottle in the morning after finding that the ones in storage are generally cooler than those left out.

VIEWER NOTES:

COMBAT SERVICE SUPPORT

TOPIC: Diarrheal disease.

OBSERVATION: A battalion was declared "Combat Ineffective" after 50% of its personnel (30% requiring medical assistance) contracted dysentery from "veterinary service approved" salad. Diarrheal disease, after heat-related injuries, are the greatest medical threat to soldiers deployed on Operation Desert Shield. Listed below are several recommended measures that personnel can take to prevent an epidemic of diarrhea:

a. Assume all water sources are considered non-potable, and all ice, meats, fruits, vegetables, and other locally purchased food items are considered contaminated, unless obtained with approval of a medical officer.

b. Consume only the food items listed below that have been approved:

(1) Standard Army field rations (MRE, T and B rations) issued in Army Mess Halls.

(2) Peelable fruits, i.e., oranges and bananas, apples, and pears after being peeled and washed.

(3) Sealed UHT milk, butter and juice cartons, and canned carbonated beverages.

(4) Saudi water department approved sterilized bottled water for consumption and brushing teeth, and chlorinated (with residual above 2.5ppm) bulk water for showering and washing clothes.

c. Keep all food covered and protected from flies during storage and serving.

d. Serve hot meals at serving temperature and store food items at temperature of 45 degrees or less.

e. Personal hygiene measures such as hand washing, correct waste disposal, proper care of latrine areas, and good vector control is imperative.

f. Unit personnel venturing to other units should consume only those approved food items listed above.

VIEWER NOTES:

COMBAT SERVICE SUPPORT

TOPIC: Water buffalos.

OBSERVATION: Water buffalos will drop in chlorination and average of one (1) part per million per day - they should be checked twice daily for chlorine content.

VIEWER NOTES:

TOPIC: Cooling system for the Tactical Operations Center (TOC) radios.

OBSERVATION: You have got to have fans in the TOC - radios will burn up quickly without them. Fans have to be dedicated to blowing directly on the radios - along with a wet towel will keep the operating temperatures down. Temperatures in the shade of the TOC extensions generally isn't bad if you can keep the air moving - large pedestal fans which rotate and oscillate seem to work the best.

VIEWER NOTES:

TOPIC: Maintaining the lithium batteries.

OBSERVATION: Purchase small dormitory style refrigerators to keep lithium batteries in - otherwise they will only be good for about 30% of their expected life. The smaller refrigerators are more portable and draw less power.

VIEWER NOTES:

COMBAT SERVICE SUPPORT

TOPIC: Tentage maintenance.

OBSERVATION: Tentage - units must maintain tentage - we don't do this well - we have got to stock and maintain these items - again an item which could be pre-configured. This will become more critical as winter comes on since the contracted hodge tents (Bedioun tents) are too dangerous for heaters and do not repel wind or rain very well.

VIEWER NOTES:

TOPIC: Bulk water.

OBSERVATION: Bulk water - all our water handling assets are at depot or prepositioned but they are not configured to support the force. We need to put these assets into "force packages" (Bn sets or smaller) and issue them that way. Bulk water handling falls into four groups: Production (such as a ROPU, reverse osmosis pump unit), storage such as a forward area water point storage system (FAPWPSS), distribution, and finally chillers. These four items need to be issued as a package but they currently are not tailored that way. For example we can get control of a 100K ROPU but we do not need one that large.

VIEWER NOTES:

COMBAT SERVICE SUPPORT

TOPIC: Class I.

OBSERVATION: It has to be a supply point distribution system - we have no push capability. Out here the units are 100% dependent for Class I and it really hits home - there is no cheating - like bakery runs or borrowing from another unit or mess hall nearby. Material handling equipment is a major problem.

VIEWER NOTES:

TOPIC: The Mechanized Infantry Modified Table of Organization and Equipment (MTOE).

OBSERVATION: The Mech IN MTOE is totally lacking in the support area for this theater - companies have only one (1) wheeled vehicle which is totally insufficient. Distances are exaggerated. The ISG, XO and CO must have wheels. Admin commercial vehicles, as long as they are 4-wheel drive might be a better solution rather than military vehicles. In addition, the water carrying capability of a typical unit is insufficient - unsure how things would of went if there was not commercial haul available.

VIEWER NOTES

TOPIC: Casualty cards.

OBSERVATION: Casualty cards need to be a triplicate form so that the unit can retain a copy - experience in Panama was that they had to make a copy of the card because commanders will generally want stats on type, number of wounds, friendly fire casualties, etc.

VIEWER NOTES:

COMBAT SERVICE SUPPORT

TOPIC: Casualty Feeder Report and Witness Statement.

OBSERVATION: The unit S-1 recommended having every soldier fill out and carry a casualty feeder card and a blank witness card in his gas mask. This is a troop morale issue. S-1 considers it the same as dog tags or any other admin preparation for war.

VIEWER NOTES:

TOPIC: Notification of next of kin (NOK).

OBSERVATION: A problem has been identified with the notification of next of kin (NOK) who happen to be located here in theater. Form 93 life insurance notification forms need to have an annotation on it in the future which notes that the NOK is a service member.

VIEWER NOTES

TOPIC: Shortage of 1:100,000 maps.

OBSERVATION: There is still a map shortage problem - no 1:100,000 maps, no maps of the Kuwait border (North). Maps need to be managed well ahead of time - units down South have maps for up North and vs versa.

VIEWER NOTES:

COMBAT SERVICE SUPPORT

TOPIC: Contract water supply.

OBSERVATION: Contract water suppliers have difficulty in keeping up with daily requirements - further it's delivery is slowed because 90% of the deliveries are not palletized and each semi-load needs to be manhandled.

VIEWER NOTES:

TOPIC: Water.

OBSERVATION: Bottle water has been our main route - it reduces initial health risk and overcome the current bulk water shortages. However it's unrealistic to depend on bottled water over the long term. Our current goal is one (1) case of water (4.5 gallons) per man per day. In addition to that we are allocating 10 gallons of bulk water for washing, cooking, etc., that equates to about 15 gallons per man per day. We have revised our estimate from Fort Bliss of 22.5 gallons per day to an optimum of 19.3 gallons a day and we should reach that capability by the end of the month.

VIEWER NOTES:

TOPIC: The Admittance and Disposition Report.

OBSERVATION: Units are not receiving instructions at unit level for disposition of personal property. The A&D report (admittance and disposition?) is not being forwarded to units. Problems with backlogs of personal property at units - units don't know status of soldiers - whether evacuated to CONUS or USAREUR - or wherever else. Patient tracking out of theater is nonexistent.

VIEWER NOTES:

COMBAT SERVICE SUPPORT

TOPIC: Morale, welfare, and recreation (MWR).

OBSERVATION: Two other big morale factors - mail and ice - try to get them to the soldier daily - doesn't really matter what the ration cycle is - soldiers will eat anything as long as they get the first two and they perceive that the chain-of-command is taking care of him.

VIEWER NOTES:

TOPIC: Marking pens for laundry.

OBSERVATION: The units forgot marking pens for laundry - trying to improvise until they can be purchased. Soldiers should bring along clothes pins and clothes lines to do what ever wash they want to do rather than sending it into the laundry. Each piece has to be marked for commercial laundry pickup. Sufficient laundry bags are important as well since one will almost always be turned in.

VIEWER NOTES:

TOPIC: Aramco sponsor-a-soldier program is a big morale booster.

OBSERVATION: Biggest helper of morale is the Aramco sponsor-a-soldier program. The local western families have been picking up soldiers, letting them wash cloths, having a hot shower and meal, TV and phone calls home. Average length of stay is about five hours. One downside is some instances of alcohol use has been reported when the families offered some "home brew" or other alcohol they had obtained.

VIEWER NOTES:

COMBAT SERVICE SUPPORT

TOPIC: Desert Express.

OBSERVATION: Project code 9AU should be used once deployed to Saudi Arabia when requisitioning Class IX repair parts associated with non mission capable system (NMCS) deadlined equipment. This will facilitate movement of critical repair parts through Charleston AFB via daily dedicated C-141 flight to Saudi Arabia.

VIEWER NOTES:

TOPIC: NICAD Batteries.

OBSERVATION: NICAD Batteries: Require frequent recharging if used or stored at temperatures above 115 degrees Fahrenheit. Batteries should be recharged at temperatures below 90 degrees Fahrenheit. Recommend recharging at night or early morning.

VIEWER NOTES:

TOPIC: Cables are being broken faster than normal.

OBSERVATION: Cable connectors are expanding in the heat making cables much more difficult to connect/disconnect. Extra force is required to turn connectors, which is resulting in broken internal connections in the cables. Radio Preventive Maintenance Checks and Services (PMCS) and maintenance should be done in the morning or evening. Extra care needs to be taken in dealing with cables.

VIEWER NOTES:

COMBAT SERVICE SUPPORT

TOPIC: Resupply in a desert environment is critical.

OBSERVATION:

- Vehicle support is a must due to excessive soldiers load. Loads can be tailored to meet mission based on mission analysis.

- Water must be resupplied twice in 24 hours due to consumption.

- Drink water!!

- Field sanitation teams are a must--train them.

- Prescribed Load List (PLL) and other critical supplies are hard to come by. Bring what you can.

- Dig pits to cool rations/water.

- Every critter here is on a mission to give you a disease.

- Vehicles can easily get stuck in soft sand. Soft sand can suddenly appear in front of you. Escort trucks with HMMWVs.

VIEWER NOTES:

COMBAT SERVICE SUPPORT

TOPIC: Combat service support.

OBSERVATION;

- Bring some coolers for rear area.
- Bring fly swatters.
- Bring insect repellent.
- Batteries last about 90% of expected life. Batteries overheat quickly due to dust, built up grime and sand. Frequent cleaning of battery caps will prolong life.
- Reduce HMMWV voltage to 27.0 on 24v system.
- Winches--difficult to find anchor.
- Vehicle idle needs adjustment when using JP8 fuel.
- Panty hose over air intake prolongs air filter life.
- Generator semi-annual services should be performed weekly.

VIEWER NOTES:

TOPIC: Personal hygiene items for sick call.

OBSERVATION: Soldiers on normal hospital runs are showing up without gas mask and personal hygiene items. Units should attempt to ensure these items accompany admitted soldiers if there is time.

VIEWER NOTES:

COMBAT SERVICE SUPPORT

TOPIC: Commo link with the Navy MEDEVAC ships.

OBSERVATION: Army has no communications link with the Navy ships - very easy to loose track of soldiers which have been evacuated to these facilities.

VIEWER NOTES:

COMMAND AND CONTROL

TOPIC: Send Liaison Officer (LNO's) early as possible.

OBSERVATION: Send LNO's early as possible - earlier the better. Insure that the LNO's have enough rank to do the job. Take time to train the LNO's prior to departure if necessary. Personality is important - if dealing with an Infantry unit, be aware of the Infantry mentality. The unit's opinion is that the LNO should have been in country earlier perhaps to influence the stationing and missions decisions. Experience so far shows that the theater is unusual in that units have to barter for space and missions.

VIEWER NOTES

TOPIC: Guard duty.

OBSERVATION: Those on guard at night often find it too hot to sleep during the day so shorter shifts will be worked into the guards' schedules to allow all some time to sleep during cool portions of the day.

VIEWER NOTES:

TOPIC: Safety.

OBSERVATION: Don't burn small arms boxes - the fumes are toxic as the boxes are treated with PCB bearing preservative. In addition the boxes should not be handled with bare hands.

VIEWER NOTES

COMMAND AND CONTROL

TOPIC: Blackout drive.

OBSERVATION: Tough to enforce blackout drive rules and light lines when rental vehicles and contract drivers have no capability or training in driving with low-light/no-light. Plan linkup points or drop off points in acceptable risk areas.

VIEWER NOTES

TOPIC: Communications malfunction.

OBSERVATION: In the heat of the day you will tend to loose commo with distant units on FM - some disruption is noted on AM nets. Commo improves with nightfall.

VIEWER NOTES

TOPIC: Port security.

OBSERVATION: Unit was concerned about port security - set up it's own checkpoints and barricaded the living areas with tracked vehicles in a "standoff" perimeter. Control of civilian vehicles in the port was still difficult - especially the contractors supporting the unit.

VIEWER NOTES

COMMAND AND CONTROL

TOPIC: Low band FM frequencies do not work.

OBSERVATION: Except over very short distances, FM frequencies in the low band do not work. Tests conducted over varying distances from 50 meters to 35 + kilometers have repeatedly had the same results. When the test radios were changed to high band frequencies, transmissions were loud and clear. A major problem is that all MUC and division nets, to include retrans frequencies, are in the low band; high band frequencies are found below battalion level. The solution currently being implemented is to take high band frequencies from geographically separated subordinate units and use them for brigade nets. This solution is troublesome in that units (or aircraft) entering the brigade area do not know in advance what frequency to come up on. One possible solution could be to use 301 frequencies as a starting point, and then flip to the opposite band before using radio. This could cause additional frequency conflicts; will not work with squad radios that cannot flip from one band to another. No easy solutions are available, but some standardized solution is required.

VIEWER NOTES

TOPIC: Communications.

OBSERVATION: Ensure convoys have a method of reporting closure and that they are covered with a commo "cap" to assist them should the convoy encounter difficulty. The regiment deployed it's first elements out to the desert with no accompanying commo. The initial sights were within the FM retrans capability of the regiment.

VIEWER NOTES

COMMAND AND CONTROL

TOPIC: Command & Control is difficult in the desert.

OBSERVATION:

- Mission type orders are critical.
- Tendency to rely on radio (PRC 126) for control of movement.
- Control measures tied to terrain are ineffective. May require extensive use of WP and smoke.
- Aircraft can destroy a mission if they don't land on the LZ.
- Multiple means of communications must be in place to ensure commo. Commanders must accept less than instant communication. A/C retrans may be required.
- Soldiers must be familiar with field expedient antennas in order to talk great distances.

VIEWER NOTES:

TOPIC: Displaced civilians.

OBSERVATION: Displaced civilians may be a problem - Saudi's are close hold on their plan as to where camps will be, etc. They will most likely be overwhelmed if fighting breaks out as there are over 30K personnel in the coastal region North of Jubayl alone. Their simultaneous exodus would choke all primary Main Supply Routes (MSRs). U.S. Army working on a backup plan just in case. Can't talk about it to the Saudi's because it would demonstrate a "lack of faith" in them.

VIEWER NOTES:

COMMAND AND CONTROL

TOPIC: Protection of communication equipment in the desert.

OBSERVATION:

- Directional antennas help.
- Changing from a SIRATT to the "gold wing" system, while good at division, cuts down on information available at brigade. Because multi-channel is not always available, computer to computer is not always an option.
- Buildings for CP/Commo centers are a must. The reduction in dust and heat greatly increases equipment life and availability.
- Keep radios cool with a wet towel or a cover to shade them but do not restrict airflow around radio.
- WD1 does not melt, even if exposed to direct sunlight, but desert goats can eat WD1.

VIEWER NOTES:

TOPIC: Joint Passage of Lines.

OBSERVATION: Still working problems of the joint passage of lines; need common graphics for the passage. There is not a common ADA coverage since different units are using different methods of MSCS (Manual SHORAD Control System). The covering force battle has got to have a single common commander both to control the force laterally and to direct the enemy into the main battle area that we desire.

VIEWER NOTES

LESSONS LEARNED SIG-3F